

Comments on California Air Resources Board Dairy Sector Workshop

August 22, 2024

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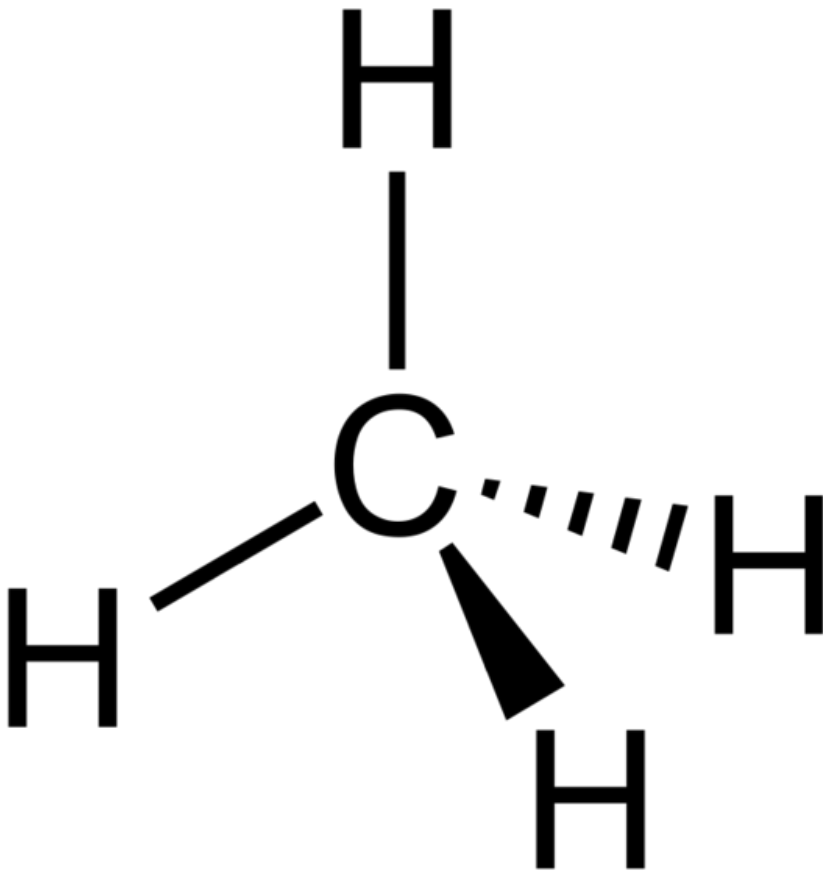
Dear CARB Staff,

THE CLEAN ENERGY CONTEXT

CA policies, including the CARB Scoping Plan, call for a transition to clean energy generation. We have plentiful amounts of the cleanest energy resources (geothermal, wind, solar) for all our in-state energy needs. These do not emit toxic air contaminants (TACs) or GHGs. Prioritization of the scaling of these three would have numerous benefits for all CA residents. Electrolytic hydrogen, made with 100% energy from any of these three, is one of the cleanest storage technologies. Such H₂, along with the three generation sources, should receive public incentives and tax credits. Farmers could contribute to scaling of these resources, while pocketing incentives, by locating generation plants on their farms, e.g., via agrivoltaics.

Energy technologies entailing combustion in generation or end use, anaerobic processing, or using methane (CH₄) should not receive public incentives including LCFS credits. Dairy digesters have each of these characteristics. Government incentives increase their use, which increases emissions of CH₄, CO₂, and TACs. Replacing use of CH₄ with geothermal, solar, and wind would accelerate the decarbonization of our economy 1).

METHANE 101



WHAT HAPPENS TO ATMOSPHERIC METHANE?

CH₄ naturally breaks down into other GHG gasses

Ozone

Tropospheric days to weeks

Stratospheric decades

Water vapor weeks

Carbon monoxide two months

Carbon dioxide centuries

Methane is a SLCP, but its breakdown creates long-term GHGs.

WHAT TOXIC GASSES ARE CREATED BY METHANE COMBUSTION?

		GWP
NOx nitrous oxides	up to	280
Reactive oxygen gasses	up to	14,000
Carbon dioxide		1
Methane		84
Particulate Matter		
Brown Carbon >2.5 um	up to	1000
Black Carbon <2.5 um	up to	4400

Emissions from combustion of agricultural biomass and waste are particularly high in brown carbon.

CH₄ from any source has the same radiative forcing effect. So, it is equally important to decrease CH₄ emissions from each source including coal mining, CAFO lagoons, fugitive emissions from digester systems, fossil wells, etc. In CA, the sector with the highest CH₄ emissions is livestock.

FUGITIVE CH₄

In recent years, research has consistently revealed that fugitive emissions from methane pipelines is significantly higher than EPA estimates. The EPA has based its inaccurate estimates on self-reports from fossil corporations. Independent empirical research, in contrast, has found emission rates that are up to ten times higher than industry self-reports. The sum of fugitive plus combustion GHG emissions from CH₄ is approximately equal to that of coal energy. To accurately quantify the lifecycle carbon intensity of digesters, measurement of fugitive emissions from digester systems is necessary. CARB would set a commendable scientific precedent for other states by reviewing the literature on this topic and conducting repeat measures of CH₄ and TAC emissions from dairies 2).

Fugitive emissions of CH₄ and TACs also occur from open storage of biowaste. Lagoons have the highest CH₄ and TAC emissions of any storage method. Lagoons contain non-therapeutic antibiotics and pathogenic microbes. Lagoon waste can run off to pollute our water resources including aquifers and surface water.

MITIGATION MEASURES for DAIRIES

Regulation is recommended using means that have been proven safe and effective. These means include 3)

Solid separation (dry processes)

Vermifiltration

Downsizing herd size

Lagoon additives, e.g., microbes and straw

Dietary supplements e.g., 3NOP and marine algae

Replacing CAFOs with pastures.

There is extensive literature exposing the cruelty of CAFOs. In contrast, pastures allow herds to roam freely and fertilize the earth with manageable concentrations of nutrients. This aerobic process increases soil carbon storage. Pastures should include trees and ten-foot-high solar panel shelters to protect herds from heat stress. Grasses and trees in pastures sequester CO₂, contributing to 30 x 30 goals of sequestration in natural and working lands. Incentives should be available to farmers to decrease CAFO size and a) increase pasture size, b) use regenerative organic agriculture to grow crops. Along with the CA Dept. of Public Health, CARB should conduct a long-term educational campaign on the environmental and health benefits of increasing the percent of one's caloric intake from plants while decreasing animal product intake 4).

Farmers provide a vital service to all Californians. They should be highly compensated, in part via public incentives. However, incentives should be provided to farmers only for measures that benefit all CA residents and cause only insignificant harm to a few CA residents. CARB's current incentives fail to meet this standard.

Thank you for the significant headway you have made on this issue. In keeping with the precautionary principle, please accelerate the quantity of MT of CH₄ mitigated annually. Climate scientists do not know what extent of GHG emissions and warming that the biosphere can withstand before catastrophic tipping points occur.

Best Regards,

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David Bezanson

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CA resident and voter

ENDNOTES

1) Jacobson, Mark No Miracles Needed Cambridge U: Cambridge University Press,2023. **Online ISBN:** 9781009249553 **DOI:** <https://doi.org/10.1017/9781009249553>

2) https://cendigitalmagazine.acs.org/2024/08/01/us-methane-emissions-dwarf-epas-data-2/content.html?utm_email+=854335D43445F5B65435147031

3) <https://www.cbsnews.com/sanfrancisco/news/project-earth-methane-eating-microbes-windfall-bio-menlo-park/>

4) Feher, Andras, et. al., A Comprehensive Review of the Benefits of and the Barriers to the Switch to a Plant-Based Diet *Sustainability* **2020**, 12(10), 4136; <https://doi.org/10.3390/su12104136>